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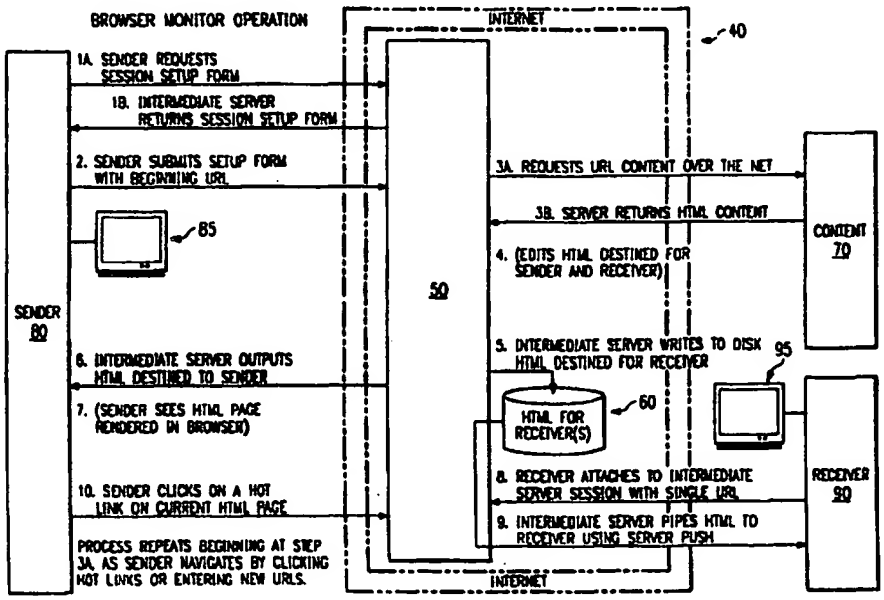

(57) Abstract

An apparatus and method for sharing data between a sender computer (80) and a receiver computer (90) through an intermediate server (50) and a network (40) are disclosed. A control program loaded on intermediate server (50) directs it to retrieve data from a content server (70) and send the content to sender computer (80) and receiver computer (90), allowing each to view the same data simultaneously.

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SERVER-BASED BROWSER MONITOR

Technical Field

The present invention relates generally to computer networks, and more particularly, to an apparatus and method for monitoring information received by a user of a network.

RELATED PATENT APPLICATIONS

This application is related to U.S. Patent Application serial number 08/839,237 (Our Docket No. 7099.0016) entitled "Server-Based Host Monitor," filed on April 28, 1997, which is incorporated herein by reference as if fully set forth, and U.S. Patent Application serial number 08/840,665 (Our Docket No. 7099.0017) entitled "Server-Based Kiosk Controller," filed on April 28, 1997, which is incorporated herein by reference as if fully set forth.

Background Art

In recent years, computer networks have grown very popular with computer users as a means of communicating and exchanging information. Such networks allow personal computer users to connect with each other, either directly or through a central communication point, and to exchange information by using a protocol common to each personal computer in each network. Corporations and businesses now commonly network computers used by their employees in "intranets," which are networks that have limited access to certain persons and/or computers. Such intranets are often protected by elaborate security systems or "firewalls" which prevent unauthorized users from accessing the intranet or retrieving internal intranet data. By contrast, the term "Internet" has been adopted to describe the publicly available network to which virtually every personal computer in the world has access. Recent improvements in the software available for accessing and searching the Internet have made the Internet a very popular

source of information which can even be utilized by novices to computer technology.

Computers communicate on intranet and internet networks by the use of a common set of standards for exchanging data known as the Transmission Control Protocol/Internet Protocol ("TCP/IP"). To initiate communication on a such network, a user, known as a "client" contacts another computer on the network, known as the "server" or "host," by using various publicly available software programs. In public networks such as the Internet, these programs use various protocols to organize information in a manner which allows the user to locate and access files of interest to the user. For instance, some files are organized by a hierarchical menu system known as the "gopher." A user can search the Internet by linking from an Internet site of interest, or by entering the uniform resource locator ("URL") of the file on the gopher which the user wants to review.

The most popular and user-friendly protocol for organizing information on the Internet has become the World Wide Web (the "WWW" or "Web"). The Web links information by associating items of interest through a common scripting language known as Hyper Text Markup Language ("HTML"), and transmits these HTML-based files between servers and clients using a common protocol known as the Hyper Text Transfer Protocol ("HTTP"). A Web user searches the Web by starting at the user's "home page," which is created and operated with HTML. From the home page, the Web user searches out and retrieves information by using "web browser" software. Web browsers allow a Web user to retrieve and render images and texts from files of interest to the user's computer. Web browsers operate by allowing a Web user to identify a "Web link" of interest on a Web page and then execute the Web link to transfer the computer data associated with the Web link from the server or host computer containing that data to the Web user's computer. Web links perform this transfer of computer data by communicating the URL of the desired file to the host.

The introduction of the Web with its easy-to-use browsers and the increasing availability of internet access service providers ("ISP's") have each

led to an increase in the usage of the Internet because each has made the Internet easier to access and use. Despite these improvements, the Internet remains a technical environment which is often difficult for a user to navigate. Users can easily become lost in "cyberspace," making them frustrated and either unable or unwilling to use the Internet for commercial purposes. Accordingly, both users of the Internet and commercial businesses seeking to market goods and services through the Internet would benefit from any tool that makes the Internet easier to use and/or easier to learn to use. However, such universal tools are difficult to develop because of the wide array of hardware systems that access the Internet. In addition, the implementation of and instruction in such tools is difficult because Internet users are often geographically located a great distance apart, making face-to-face instruction impractical. This difficulty is compounded further by the variety of protocols and software available to access the Internet, and, when the user is accessing the internet from an intranet, by the "firewall" security systems in place around intranets.

One means for assisting a network user is to post a phone number which the user can call with questions when the user accesses a particular network site. However, a network user who has become confused enough to call for help is also often too confused to explain the problem or problems he is experiencing. To overcome this difficulty, the person trying to help the confused user can access the same network site as the user. However, this only allows the helper to view what the confused user should be viewing, and does not necessarily render the same computer monitor screen display as is rendered on the confused user's monitor.

Known systems, often referred to as remote control systems, may allow a computer, referred to as a "client," to receive and render the same monitor screen data as is rendered by a separate computer, referred to as a "host;" however, such systems require additional software at the client and host computers, and also require compatibility between the client and host with respect to the hardware and/or software used by the client and host. Thus, in order to use these existing systems, the client and host must first

exchange hardware and/or software data, as well as know each other's network address. In addition to being complicated, these systems require considerable processing by each computer and are thus slow in use. Further, these systems require protocols that are not commonly used on public networks such as the Internet. Thus, corporate intranets that allow access to the Internet through gopher and HTTP protocols may not allow unrecognized system-specific protocols associated with the existing systems to pass through their firewalls.

Disclosure of the Invention

Therefore, a need has arisen for a universal tool which simplifies the use of networks and simplifies the process by which network users learn to navigate networks.

The present invention provides an apparatus and method for exchanging data between computers that is a powerful tool for using and teaching the use of networks in a simple and straightforward manner.

More specifically, the present invention allows a receiver computer to render the content data presented by a sender computer when the sender computer accesses a content server through an intermediate server. A control program loaded on the intermediate server directs the intermediate server to receive content data from the content server which the sender computer requested. The control program then directs the intermediate server to transfer the content data to the sender computer, thus allowing the sender computer to render the data which the sender computer would have rendered had it contacted the content server directly. Finally, the control program directs the intermediate server to transfer the content data to the receiver computer. The content data allows the receiver computer to render the same data that the sender computer has rendered.

The present invention provides an important technical advantage by allowing a receiver computer to render the same data rendered by a sender computer when that sender computer accesses a network through an intermediate server. This allows two geographically separated network users

to simultaneously navigate a content server even if the network users have different types of computer systems and software. Further, the sender and receiver can use the present invention through an intermediate server's domain name without exchanging sender or receiver IP addresses. Further, the present invention enables transmission to take place even if both sender and receiver are behind firewalls which allow transmission of data through widely-accepted protocols such as the Hyper text Transport Protocol ("HTTP") and the File Transport Protocol ("FTP"), but which commonly prevent transmission of data using other less widely accepted protocols or proprietary protocols.

Brief Description of the Drawings

A more complete understanding of the present invention and advantages thereof may be acquired by referring to the following description taken in conjunction with the accompanying drawings in which like reference numbers indicate like features and wherein:

FIGURE 1 shows a block diagram of the one embodiment of the present invention sharing content data between a sender and receiver computer through the Internet;

FIGURE 2 shows a block diagram of one embodiment of the present invention interfaced with the sender computer through a re-direct program; and

FIGURE 3 shows different embodiments of the present invention, including the use of a tunnel across a corporate firewall.

Best Mode for Carrying Out the Invention

Preferred embodiments of the present invention are illustrated in the FIGURES, like numerals being used to refer to like and corresponding parts of the various drawings.

The present invention uses the common protocol of a network to allow a receiver computer to receive the same data as a sender computer. The receiver computer and sender computers interface with an intermediate

server through a network. A network is any means of transmitting data between computers, and generally entails the use of a common protocol. The intermediate server has a control program which directs the intermediate server to send selected data to the sender computer and the receiver computer. The selected data can be data that resides in the intermediate server or data which the intermediate server obtains from another computer interfaced with the network. When the data transmitted by the intermediate server comprises screen data, meaning data which causes a computer monitor to render a particular screen display, then both the sender computer and receiver computer have the ability to render an identical screen display.

Referring now to FIGURE 1, an embodiment of the present invention is depicted as interfaced with the Internet 40 by using the protocol of the World Wide Web. The term Internet as used herein refers to any network to which the public has access. Generally, a computer user can interface with the Internet through any telephone line or equivalent means of communication if the user's computer can implement TCP/IP or any other compatible protocol. Although FIGURE 1 depicts the present invention's interaction with the Internet 40, it should be understood that the present invention can interact with an intranet in the same manner.

An intermediate server 50 interfaces with Internet 40 at a location code such as a domain name. Typically, servers that interface with any network have a processor, which operates the interface to the network, and at least one storage device. The interface itself is typically accomplished through a modem, although other means are available, such as ISDN or the high speed trunk lines which form part of the Internet. In one embodiment, the intermediate server has a processor with at least the capability of an Intel 386 processor, which is the minimum capability generally required to efficiently run the Web's HTTP protocol. The interface of this embodiment of the intermediate server 50 may be a modem, but any interface having the ability to receive input from at least two clients will suffice. The memory of this embodiment includes local RAM memory sufficient to run the HTTP protocol and a local storage device 60 which is a disk storage device having at least

enough memory to store an HTML page, although an equal amount of RAM or other memory will also work. Numerous types of single storage devices having adequate size may serve as the storage device for intermediate server 50.

Content server 70 interfaces with the Internet 40 to make the content server 70 accessible to intermediate server 50. Any computer to which intermediate server 50 has access by a network may act as a content server for the present invention. This means that content server 70 should preferably include at least one interface, the ability to use a protocol common to intermediate server 50, and some content data of interest to a user stored in an accessible memory storage device at an identifiable location. In one embodiment, the content server contains a Web page stored in HTML at a URL.

Sender computer 80 and receiver computer 90 interface with Internet 40, to be accessible to intermediate server 50. Any computer which intermediate server 50 may access through a network may serve as either a sender computer or a receiver computer. Sender computer 80 and receiver computer 90 should each include at least one network interface and an ability to use a protocol in common with the intermediate server 50 protocol. In one embodiment, sender computer 80 and receiver computer 90 possess a processor with at least the capability of an Intel 386 processor, which is the minimum capability generally required to run the Web's HTTP protocol, and render a Web page upon a computer monitor screen. A sender computer monitor screen 85 renders screen data received by sender computer 80 in a viewable format, and a receiver computer monitor screen 95 renders screen data received by receiver computer 90 in a viewable format.

Steps 1-10 of FIGURE 1 illustrate the operation of the intermediate server 50 for sharing data between sender computer 80 and receiver computer 90. In step 1a, sender computer 80 interfaces with intermediate server 50. An identification program loaded in the memory of intermediate server 50 directs intermediate server 50 to send a session setup form to sender computer 80, as is depicted in step 1b. In one embodiment, sender

computer 80 interfaces with intermediate server 50 by using a standard Web browser, which retrieves the setup form and renders it on sender computer screen 85. A user can then input sender information to identify himself and to select content data stored at a content identification code which is of interest to him. As is depicted at step 2, a user can input the URL of the selected content data and send this URL to intermediate server 50. Other ways of identifying the selected content may also be used.

In step 3a, a control program loaded on intermediate server 50 directs intermediate server 50 to interface with the selected content server 70, and, as step 3b depicts, receive the data identified by the URL which the sender computer user originally input. For instance, if the user input a URL of http://www.content.interest.com into a Web browser, intermediate server 50 would receive this URL and act as an agent for the browser of sender computer 80 by contacting content server 70 and retrieving the HTML data located in the interest subdirectory.

At steps 4 and 5, when intermediate server 50 receives the selected content data, the control program directs it to store this data in local storage device 60 in unmodified form. The control program may then edit the data before storing the data on local storage device 60. For example, the control program can direct intermediate server 50 to edit HTML data by identifying the Web links within the data and modifying the Web links to point back to intermediate server 50 by appending the original Web link to the location code of intermediate server 50. At step 6, modified content data goes to sender computer 80 for its display on monitor screen 85. The display which screen 85 renders is identical to the display that sender computer 80 otherwise would render upon retrieving the data in unmodified form directly from content computer 70. An alternative embodiment may modify the content data so that the screen data remains the same, but the linking data changes into modified linking data that points back to intermediate server 50.

At step 8, a Web browser of receiver computer 90 interfaces with intermediate server 50, which the identification program directs to send a session connection form to receiver computer 90. The user of receiver

computer 90 may then identify the sender he wishes to monitor by entering an identification code of the sender. In alternative embodiments, if the receiver knows the sender it wishes to monitor, he may bypass this connection process by entering a single identifier, such as a URL, which the identification program will recognize.

At step 9, the control program directs intermediate server 50 to send the unmodified data stored in local storage device 60 to receiver computer 90. In the preferred embodiment, the browser of receiver computer 90 renders the unmodified HTML content on receiver screen 95 but maintains the TCP/IP connection with intermediate server 50 by means of a server-push technique such as HTTP MIME Type Multipart/X-Mixed-Replace. A server-push technique is used with the Web protocol, since browsers possess the ability to disconnect an Internet interface with a particular server after the user retrieves requested data. An alternative embodiment may include alternative ways of pushing the content data to receiver computer 90.

After step 9, both sender screen 85 and receiver screen 95 render the same display, but the modified Web links that sender screen 85 display lead back to intermediate server 50, whereas the original, unmodified Web links on receiver screen 95 lead directly to the content server that has the identified data. The unmodified Web links direct the browser through intermediate server 50. Thus, if at step 10 the user of sender computer 80 activates a modified Web link, the control program directs intermediate server 50 to retrieve data at the URL corresponding to the original, unmodified Web link as, set forth above starting at step 3a. The control program may then direct intermediate server 50 to retrieve, modify and transfer the data corresponding to the selected URL so that sender screen 85 and receiver screen 95 may each render the screen display associated with the selected data. Essentially, steps 3a through 10 of FIGURE 1 repeat in order as the sender navigates through the Web, but step 8 is not repeated, thus allowing the receiver to monitor the sender without additional interaction on the part of the receiver. If, on the other hand, the user of receiver computer 90 activates an unmodified Web link, the browser of receiver computer 90 will go directly to

the server associated with the Web link, thereby leaving its interface with intermediate server 50. In an alternative embodiment, receiver computer 90 may receive modified content that would disable all Web links to prevent receiver computer 90 from activating a Web link.

Referring now to FIGURE 2, by using a re-direct program loaded on a content server, an intermediate server permits monitoring a user's navigation through a network without the user's initiation. Sender computer 80 interfaces with content server 70 through the Internet 40 by entering a content data identification code, such as a URL, for content data stored on content server 70. A re-direct program loaded on content server 70 directs content server 70 to provide sender computer 80 with a modified content data identification code which redirects sender computer 80 to intermediate server 50. Intermediate server 50 then contacts content server 70 as described in FIGURE 1 at step 3a. The modified content data identification code comprises the unmodified code appended to the location code for intermediate server (50). Once sander computer 80 establishes an interface with intermediate server 50, the control program may direct intermediate server 50 to modify the data received by each content server navigated, even if the content servers being navigated do not include a re-direct program.

An example based on the Web protocol helps explain how the control program modifies identification information to point to an intermediate server having a domain name of intermediate.com. If an intermediate server, for example, retrieves data from a site having a URL of http://travelexplorer.com/jamaica", the control program may modify the name of the site to "http://intermediate.com?http://travelexplorer.com/jamaica". The control program may then search out and modify any Web links found in the data. For instance, a Web link of http://travelexplorer.com/activity" found in the Jamaica subdirectory may be modified into "http://intermediate.com?http://travelexplorer.com/activity. " Appending the original Web link to the URL of the intermediate server the control program ensures that the sender computer's activation of the Web link may send the sender computer to the

intermediate server, as well as provide the intermediate server with information of the next site which the sender computer wishes to navigate.

Although the embodiments herein are set forth in the context of the Internet as the network using the HTTP protocol of the Web, the present invention may allow a sender and receiver to share screen data in any network environment where the sender, receiver, content server and intermediate server interface using compatible network protocols. Thus, intranets operating with nonpublic protocols may include an intermediate server using the non-public protocol interfaced with the intranet.

FIGURE 3 illustrates several alternate embodiments of the present invention. Intermediate server 150 having a local storage device 160 interfaces with an intranet 140. Sender computer 180 interfaces with intermediate server 150 to receive data from content server 170. A plurality of receiver computers 190 monitor sender computer 180 as sender computer 180 receives data from content server 170 in a synchronous mode. A plurality of receiver computers 191 monitor, in an asynchronous mode, data which sender computer already received but no longer display. The asynchronous mode involves a playback program for directing intermediate server 150 to retrieve data which local storage device 160 stores. The playback program permits transmitting the data to a single receiving computer or a plurality of receiver computers, even though sender computer 180 is not currently receiving this data.

Also illustrated in FIGURE 3 is an intermediate server 50 having local storage device 60 and interfaced with the Internet 40. Sender computer 80 interfaces with Internet 40 and may use intermediate server 50 to receive data from content server 70 which interfaces with Internet 40. Receiver computers 90 share data in a synchronous mode with sender 80 through an interface with Internet 40. Receiver computers 91 are depicted sharing data in an asynchronous mode as a playback program directs intermediate server 50 to retrieve data stored in local storage device 60.

Firewall 200 protects intranet 140 from unauthorized access by computers or users outside the firewall 200. Firewall 200 maintains security

by preventing outside computers or users from accessing resources and data on intranet 140. Thus, for instance, sender computer 180 could not use intermediate server 50 to share inside data with any receiver. However, sender computer 180 can share data with receiver computers outside the firewall if internal intermediate server 150 pushes the data through an HTTP tunnel 210 to external intermediate server 50, which receiver computer 90 can freely access.

In operation, the present invention may allow a confused network user to call a help desk having a computer that is interfaced with the user's network. The help desk directs the confused user to enter in a code, such as a URL or domain name, which sends the user's computer to an intermediate servers The help desk then contacts the intermediate server with an identification code specific to the confused user. The help desk, in this way, receives the same screen data as the confused user, allowing the help desk to aid the confused user in navigating through the network.

In a similar, commercial embodiment, a user contacts a sales desk instead of a help desk, and thereby obtains sales information and guidance to network sites having commercial opportunities. In this way, a sales person may answer questions and provide additional information about goods or services available through the network site or elsewhere. For instance, the sales person may act as a sender and lead the customer through the network sites of competitors to compare products or services. Later, if the customer wants to show a friend these goods and services, the customer may retrieve data using the playback program.

The re-direct program also has powerful commercial applications. The intermediate server monitors the navigation path of a network user and store the sites visited by the user. In this way the intermediate server gathers valuable marketing information about the navigation paths of users who visit a content site. Alternatively, parents can use the data saved on the intermediate server to determine the paths navigated-by their children. Further, because the disclosed intention requires little additional computer

processing, the user being monitored will net have a reduced access speed, and will have no indication of the monitoring.

Although the present invention has been described in detail, it should be understood that various changes, substitutions, and alterations can be made hereto without departing from the spirit and scope of the invention as described in the appended claims.

Claims

1. An apparatus for sharing data between a sender computer and a receiver computer through a network, the apparatus comprising:

a sender computer interfaced with the network;

a content server interfaced with the network, said content server having content data stored at a content identification code;

an intermediate server interfaced with the network, said intermediate server having a location code and having a local storage device;

a receiver computer operationally interfaced with said intermediate server; and

a control program loaded on said intermediate server, said control program operationally directing said intermediate server to:

receive the content data from said content server;

transfer the content data to said sender computer; and

transfer the content data to said receiver computer.

2. The apparatus according to Claim 1 wherein said control program further directs said intermediate server to store the content data on said local storage device.

3. The apparatus according to Claim 1 further comprising:

a playback program loaded on said intermediate server, said playback program directing said intermediate server to:

retrieve the content data saved in said local storage device; and

transfer the content data to said receiver computer in an asynchronous mode.

4. The apparatus according to Claim 1 further comprising a re-direct program loaded on said content server, said re-direct program directing said content server to:

receive requests for content data from said sender computer; and

direct said sender computer to contact said content server through said intermediate server.

5. The apparatus according to Claim 1 wherein the content data comprises screen data.

6. The apparatus according to Claim 2 wherein:
the content data comprises screen data and linking data; and
said control program directs said intermediate server to:
modify the linking data into modified link data; and
substitute the linking data sent to said sender computer with the modified linking data.

7. The apparatus according to Claim 6 wherein said control program directs said intermediate server to substitute the modified linking data for the linking data sent to said receiver computer.

8. The apparatus according to Claim 1 wherein the network is the Internet.

9. The apparatus according to Claim 8 wherein said sender computer, receiver computer, content server and intermediate computer interface with the Internet through the World Wide Web's HTTP protocol.

10. The apparatus according to Claim 9 wherein the content data comprises an HTML Web page having at least one Web link.

11. The apparatus according to Claim 6 wherein the modified linking data comprises the linking data appended to the location code of said intermediate server.

12. An apparatus for sharing data between a sender computer and receiver computer through a network, the apparatus comprising:

a sender computer interfaced with the network;

a content server interfaced with the network, said content server having content data;

an intermediate server interfaced with the network, said intermediate server having a local storage device; and

a control program loaded on said intermediate server, said control program operationally directing said intermediate server to:

receive the content data from the content server;

store the content data on said local storage device; and

transfer the content data to said sender computer.

13. An apparatus according to Claim 12 further comprising:

a receiver computer interfaced with said network; and

a playback program loaded on said intermediate server, the playback program directing said intermediate server to:

retrieve the content data stored on said local storage device; and

transmit the content data to said receiver computer in an asynchronous mode.

14. An apparatus according to Claim 13 further comprising a re-direct program loaded on said content server, the re-direct program operationally directing said content server to:

receive requests for content data from said sender computer; and

operationally re-direct said sender computer to said intermediate server.

15. An apparatus according to Claim 12 further comprising a receiver computer interfaced with the network, and wherein said control program directs said intermediate server to transfer the content data to said receiver computer in a synchronous mode.

16. An apparatus according to Claim 15 wherein the network is the Internet and wherein said sender computer, receiver computer, intermediate server and content server interface with the Internet by using the World Wide Web protocol.

17. An apparatus according to Claim 16 wherein:

the content data comprises screen data and link data; and

said control program directs said intermediate server to:

modify the link data to point back to said intermediate server;

create modified content data comprising the screen data and the modified link data; and

substitute the content data sent to said sender computer with the modified content data.

18. A method for sharing data between a sender computer and a receiver computer through a network, the method comprising the steps of:

interfacing a sender computer, receiver computer, intermediate server and content server through the network, the content server having content data;

sending the content data from the content server to the intermediate server; and

sending the content data from the intermediate server to the sender computer and receiver computer.

19. The method according to Claim 18 wherein the content data comprises a Web page having Web links.

20. The method according to Claim 19 further comprising the steps of:

modifying the Web links into modified Web links that point back to the intermediate server; and

substituting the Web links sent to said sender computer with the modified Web links.

21. An apparatus for sharing data through a network between a sender computer, a receiver computer, and a content server having content data stored accessible via a content identification code, the apparatus comprising:

a intermediate server interfaced with the network; and

a control program for operationally controlling the intermediate server to:

receive the content data from the content server,

transfer the content data to the sender computer, and

transfer the content data to the receiver computer.

22. The apparatus of claim 21 wherein the intermediate server includes a local storage device and wherein the control program controls the intermediate server to store the content data on the local storage device.

23. The apparatus of claim 22, further comprising:

a playback program for operationally controlling the intermediate server to:

retrieve the content data stored in the local storage device, and

transfer the content data to the receiver computer in an asynchronous mode.

24. The apparatus of claim 21, further comprising:

a re-direct program for operationally controlling the intermediate server to:

receive requests for content data from the sender computer, and

direct the sender computer to contact the content server through the intermediate server.

25. The apparatus of claim 21 wherein the content data comprises screen data.

26. The apparatus of claim 22 wherein

the content data comprises screen data and linking data; and

the control program controls the intermediate server to:

modify the linking data into modified link data, and

substitute the linking data sent to the sender computer with the modified linking data.

27. The apparatus of claim 26 wherein the control program controls the intermediate server to substitute the modified linking data for the linking data sent to the receiver computer.

28. The apparatus of claim 21 wherein the intermediate server is interfaced with the Internet.

29. The apparatus of claim 28 wherein the intermediate server is interfaced to the Internet using HTTP protocol.

30. The apparatus of claim 29 wherein the content data comprises an HTML web page having at least one web link.

31. The apparatus of claim 26 wherein the modified linking data comprises the linking data appended to a location code of the intermediate server.

FIG. 1

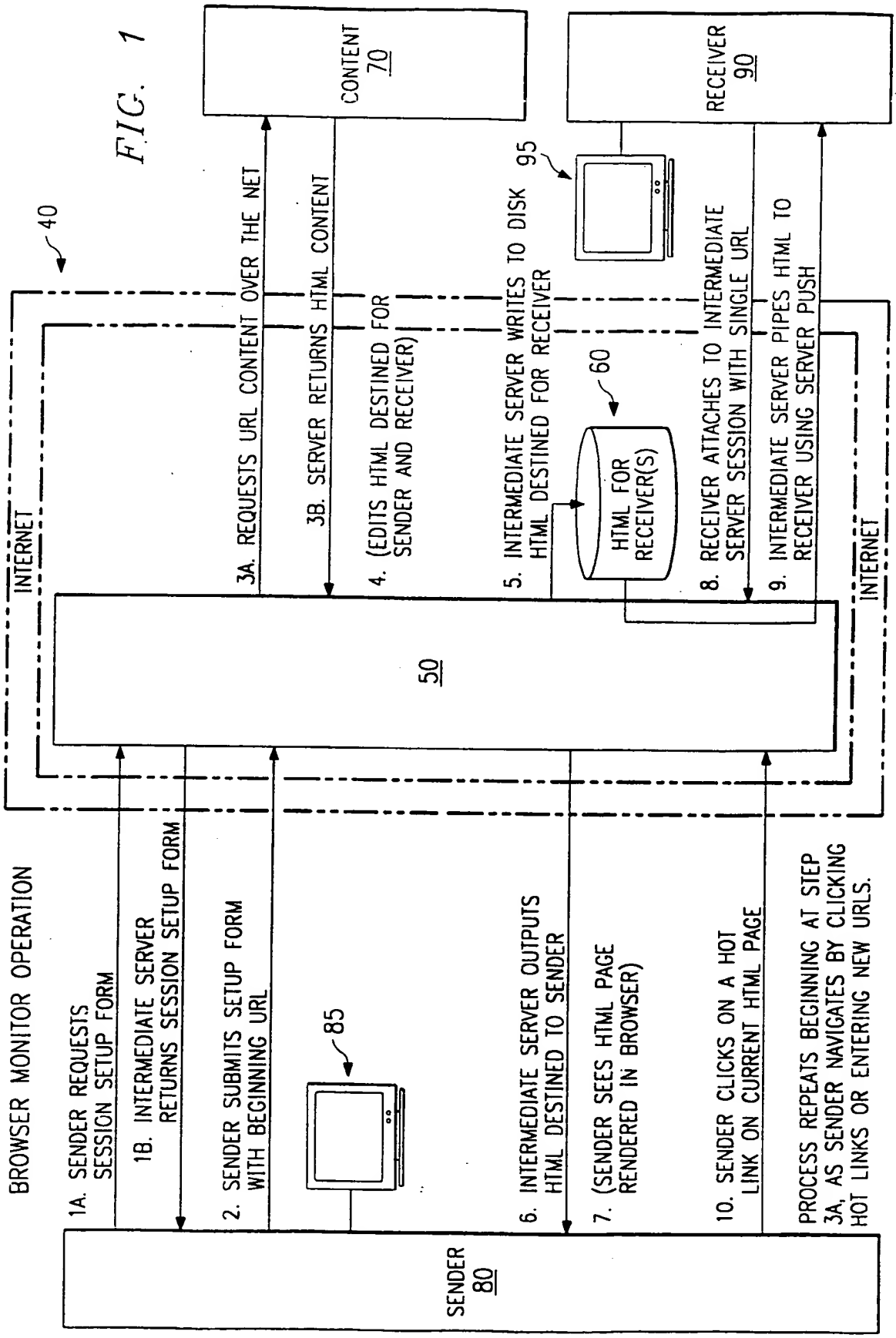
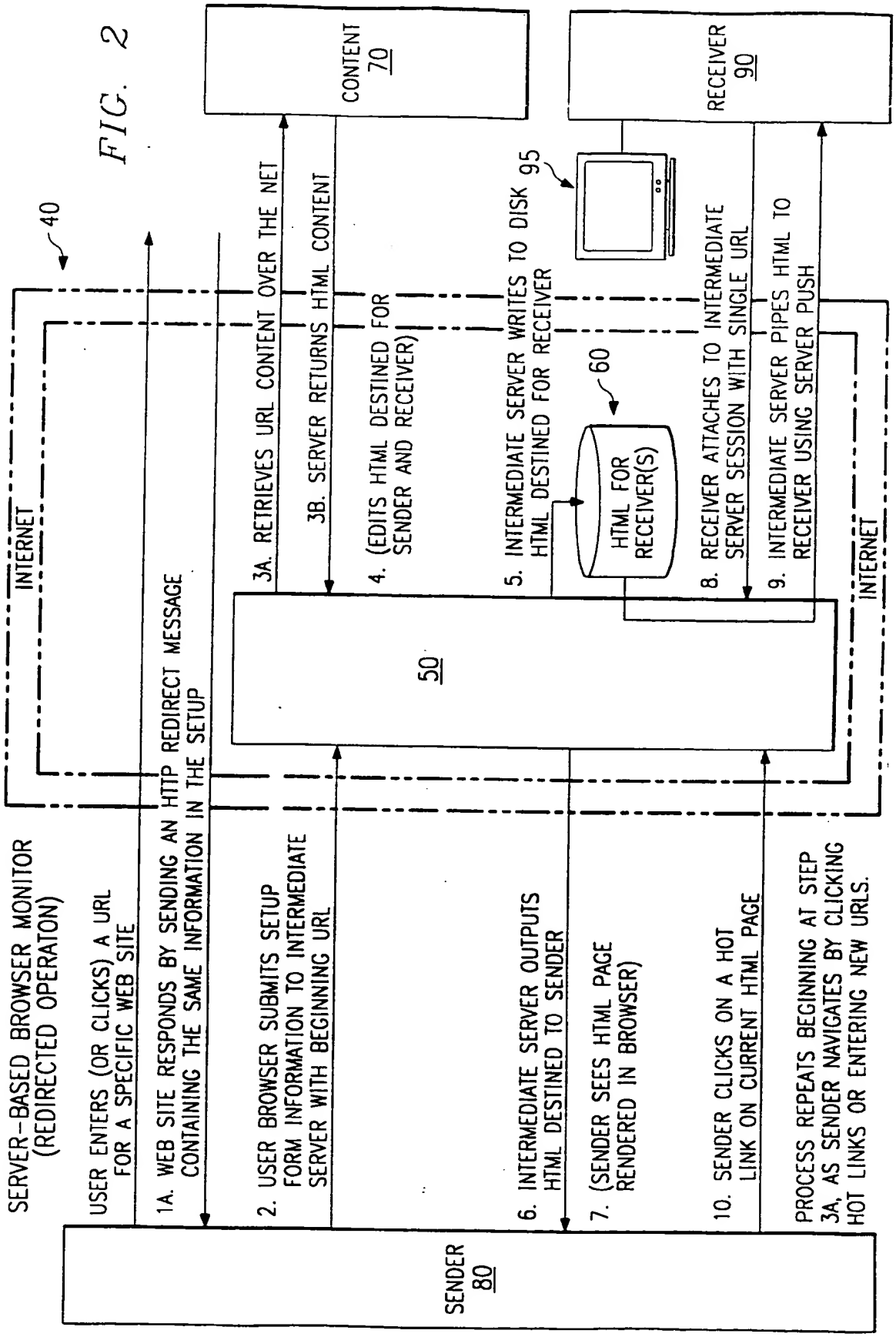

BROWSER MONITOR OPERATION
1A. SENDER REQUESTS SESSION SETUP FORM
1B. INTERMEDIATE SERVER RETURNS SESSION SETUP FORM
2. SENDER SUBMITS SETUP FORM WITH BEGINNING URL
3A. REQUESTS URL CONTENT OVER THE NET
3B. SERVER RETURNS HTML CONTENT
4. (EDITS HTML DESTINED FOR SENDER AND RECEIVER)
5. INTERMEDIATE SERVER WRITES TO DISK HTML DESTINED FOR RECEIVER
6. INTERMEDIATE SERVER OUTPUTS HTML DESTINED TO SENDER
7. (SENDER SEES HTML PAGE RENDERED IN BROWSER)
8. RECEIVER ATTACHES TO INTERMEDIATE SERVER SESSION WITH SINGLE URL
9. INTERMEDIATE SERVER PIPES HTML TO RECEIVER USING SERVER PUSH
10. SENDER CLICKS ON A HOT LINK ON CURRENT HTML PAGE
PROCESS REPEATS BEGINNING AT STEP 3A, AS SENDER NAVIGATES BY CLICKING HOT LINKS OR ENTERING NEW URLS.
INTERNET
INTERNET
40
50
60
HTML FOR RECEIVER(S)
85
95
SENDER 80
CONTENT 70
RECEIVER 90

FIG. 2


SERVER-BASED BROWSER MONITOR
(REDIRECTED OPERATON)
USER ENTERS (OR CLICKS) A URL
FOR A SPECIFIC WEB SITE
1A. WEB SITE RESPONDS BY SENDING AN HTTP REDIRECT MESSAGE
CONTAINING THE SAME INFORMATION IN THE SETUP
2. USER BROWSER SUBMITS SETUP
FORM INFORMATION TO INTERMEDIATE
SERVER WITH BEGINNING URL
6. INTERMEDIATE SERVER OUTPUTS
HTML DESTINED TO SENDER
7. (SENDER SEES HTML PAGE
RENDERED IN BROWSER)
10. SENDER CLICKS ON A HOT
LINK ON CURRENT HTML PAGE
PROCESS REPEATS BEGINNING AT STEP
3A, AS SENDER NAVIGATES BY CLICKING
HOT LINKS OR ENTERING NEW URLS.
SENDER
80
INTERNET
40
50
3A. RETRIEVES URL CONTENT OVER THE NET
3B. SERVER RETURNS HTML CONTENT
4. (EDITS HTML DESTINED FOR
SENDER AND RECEIVER)
5. INTERMEDIATE SERVER WRITES TO DISK
HTML DESTINED FOR RECEIVER
60
HTML FOR
RECEIVER(S)
95
8. RECEIVER ATTACHES TO INTERMEDIATE
SERVER SESSION WITH SINGLE URL
9. INTERMEDIATE SERVER PIPES HTML TO
RECEIVER USING SERVER PUSH
INTERNET
CONTENT
70
RECEIVER
90

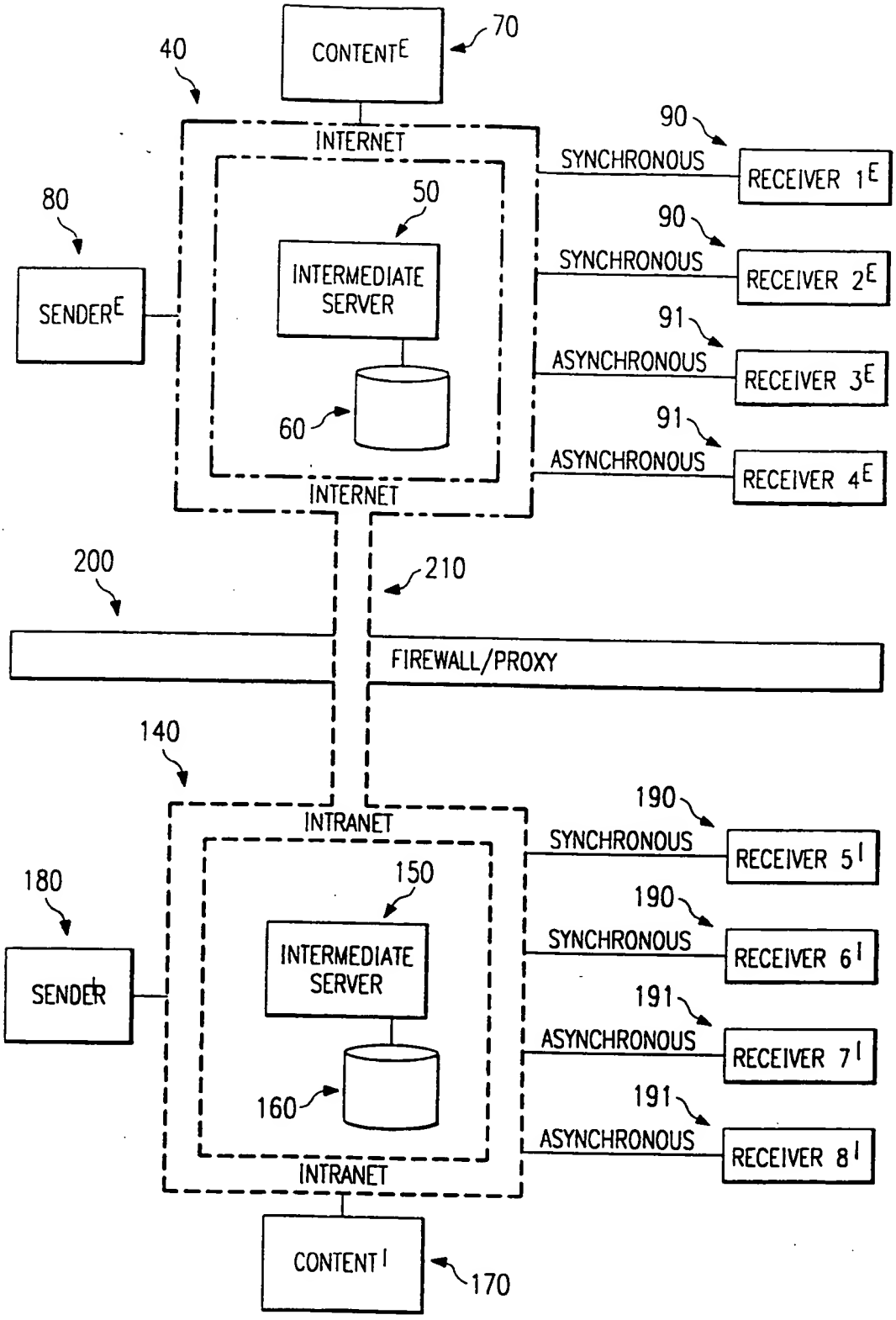

CONTENT E
70
40
INTERNET
90
SYNCHRONOUS
RECEIVER 1 E
80
50
INTERMEDIATE SERVER
90
SYNCHRONOUS
RECEIVER 2 E
SENDER E
91
ASYNCHRONOUS
RECEIVER 3 E
60
91
ASYNCHRONOUS
RECEIVER 4 E
INTERNET
200
210
FIREWALL/PROXY
140
INTRANET
190
SYNCHRONOUS
RECEIVER 5 I
180
150
INTERMEDIATE SERVER
190
SYNCHRONOUS
RECEIVER 6 I
SENDER I
191
ASYNCHRONOUS
RECEIVER 7 I
160
191
ASYNCHRONOUS
RECEIVER 8 I
INTRANET
CONTENT I
170

FIG. 3

INTERNATIONAL SEARCH REPORT

Int ional Application No
PCT/US 98/08257

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 G06F17/30 G06F17/60

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JACOBS S ET AL: "Filling HTML forms simultaneously: CoWeb - architecture and functionality" COMPUTER NETWORKS AND ISDN SYSTEMS, vol. 28, no. 11, May 1996, page 1385-1395 XP004018236 see page 1386, left-hand column, paragraph 2 - page 1393, right-hand column, paragraph 5 ---	1-31
A	EP 0 753 836 A (SONY CORP) 15 January 1997 see page 14, line 6 - page 20, line 10; figures 1,15-19 ---	1-31
	-/--	

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
22 July 1998	03/08/1998

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Fournier, C

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

Inte onal Application No
PCT/US 98/08257

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication where appropnate, of the relevant passages	Relevant to claim No.
A	PING-JER Y ET AL: "Synchronous navigation control for distance learning on the Web" COMPUTER NETWORKS AND ISDN SYSTEMS, vol. 28, no. 11, May 1996, page 1207-1218 XP004018221 see the whole document ---	1-31
A	FRIVOLD T J ET AL: "Extending WWW for synchronous collaboration" COMPUTER NETWORKS AND ISDN SYSTEMS, vol. 28, no. 1, December 1995, page 69-75 XP004001212 see page 71, left-hand column, paragraph 3.3 - page 73, right-hand column, paragraph 5 -----	1-31

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INTERNATIONAL SEARCH REPORT

Information on patent family members

Int ional Application No
PCT/US 98/08257

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0753836 A	15-01-1997	CA 2180891 A	13-01-1997
		JP 9081781 A	28-03-1997